What is claimed is:

- 1 1. A photolithographic apparatus for use in a
- 2 photolithographic system for illuminating a surface of a
- 3 substrate, said photolithographic apparatus comprising a
- 4 cover member disposed over the substrate such that a
- substantially enclosed reservoir is defined between the
- 6 substrate and said cover member, wherein said cover member
- 7 includes a top surface contoured to form an open reservoir.
- 1 2. The photolithographic apparatus of claim 1, wherein
- 2 said cover member is substantially transparent.
- 1 3. The photolithographic apparatus of claim 1, wherein
- 2 said enclosed reservoir contains a first immersion fluid.
- 1 4. The photolithographic apparatus of claim 3, wherein
- said first immersion fluid is purified water.
- 1 5. The photolithographic apparatus of claim 1, wherein
- 2 said open reservoir contains a second immersion fluid.
- 1 6. The photolithographic apparatus of claim 5, wherein
- 2 said second immersion fluid is purified water.
- 1 7. The photolithographic apparatus of claim 1, further
- 2 comprising a support platform for upwardly supporting the
- 3 substrate.

- 8. An apparatus for use with a photolithographic system
- comprising:
- a workpiece support member; and
- a cover member disposed over said workpiece support
- 5 member to form a substantially enclosed workpiece cell
- 6 between said cover member and said workpiece support
- member, wherein said cover member is substantially
- 8 transparent and includes an upper surface contoured to form
- 9 an open reservoir.
- 9. The apparatus of claim 8, further comprising a
- workpiece disposed within said workpiece cell and
- 3 vertically supported by said workpiece support member such
- 4 that a gap remains between an upper surface of said
- workpiece and the bottom surface of said cover member.
- 1 10. The apparatus of claim 8, wherein said cover member
- 2 is substantially planar and has an index of refraction
- greater than one.
- 1 11. The apparatus of claim 8, wherein said workpiece cell
- 2 contains a first transparent fluid having an index of
- 3 refraction greater than 1.
- 1 12. The apparatus of claim 8, wherein said workpiece cell
- 2 further comprises fluid ingress means for filling and
- 3 pressurizing said workpiece cell with a fluid.
- 1 13. The apparatus of claim 12, wherein said fluid ingress
- 2 means comprises at least one fluid inlet port.

- 1 14. The apparatus of claim 8, wherein said open reservoir
- 2 contains a second transparent fluid having an index of
- 3 refraction greater than 1.
- 1 15. The apparatus of claim 8, further comprising a lens
- 2 apparatus disposed over the cover member such that a final
- 3 lens element of said lens apparatus is positioned within
- 4 said open reservoir.
- 1 16. The apparatus of claim 15, wherein said final lens
- element is a lens cover.
- 1 17. The apparatus of claim 16, wherein said lens apparatus
- 2 moves relative to said cover member in a scanning
- direction, said lens cover characterized as having an
- 4 elongated lengthwise dimension oriented in parallel with
- 5 the scanning direction.
- 1 18. The apparatus of claim 17, said lens cover further
- 2 characterized as having lateral runners protruding
- downwardly and extending along the lengthwise dimension of
- 4 said lens cover such that a lengthwise channel is formed
- s along said bottom lengthwise surface of said lens cover.
- 1 19. The apparatus of claim 15, further comprising a
- workpiece disposed within said workpiece cell, and wherein
- 3 said lens apparatus further includes a workpiece normal
- 4 focus sensor for determining a correct vertical position of
- said lens apparatus with respect to said workpiece.

- 1 20. The apparatus of claim 15, wherein said lens apparatus
- 2 further includes a cover member normal focus sensor for
- determining a correct vertical position of said lens
- 4 apparatus with respect to said cover member.